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Veterinary Education

NO single factor has a greater influence on our status and efficiency as a profession than our education. All our readers who have an interest in the profession's well-being will wish to read carefully and ponder deeply the experience and views of the contributors to the symposium on veterinary education which are published in this and the succeeding issue.

In many respects the discussion propounded more questions than answers and this was only to be expected, for there can be no simple solution to the problems of veterinary education. However, in this connection it was interesting to note the universal acceptance of the value of training veterinary students within the universities; no hint could be detected of the calamities prophesied by the opponents of the Loveday Committee Reports. It seems to be agreed by those most competent to express an opinion—the teachers—that the one-portal system which had served us so well in the past imposed a rigidity of structure and method ill-adapted to training veterinary students for the problems of to-day.

Of course, some of the difficulties confronting veterinary education are not peculiar to it, they are shared by other university schools, particularly those engaged in vocational training. The selection of students, the need to keep specialist teaching within bounds so that a broad training in basic principles is given, and the desire to encourage students to partake in university life in its wider aspects so that they are trained as citizens of the world as well as practitioners of a particular discipline, are problems of university education as a whole.

The present-day system of schooling inevitably favours the child who can pass examinations at predetermined intervals, and these hurdles tend to select the memorisers of facts, who are not necessarily the possessors of enquiring minds. Furthermore, this constant need for achievement from the age of 11 onwards may be partially responsible for the breakdowns of neurotic students who, it is suggested, may be more common than they were 25 years ago. The universities, especially the vocational schools, have been responsible to some extent for the concentration of the school curriculum in its last stages on science subjects. It is refreshing to read that at least one veterinary school—Liverpool—now discourages this premature specialisation in favour of a more broadly based school curriculum.

The general agreement that specialist enthusiasm must also be controlled within the veterinary curriculum is encouraging and its implementation must be left to the self-discipline of the teachers aided, perhaps, by the Boards of the veterinary schools. Despite the need for keeping the curriculum within bounds—and it is clear that no extension beyond five years is practicable—there would seem to

(Continued on page 435)

SYMPOSIUM

VETERINARY EDUCATION

E. L. Taylor : C. W. Ottaway : R. Lovell : J. G. Wright

I—THE OBJECT OF VETERINARY EDUCATION

BY

E. L. Taylor

Weybridge

Introduction

UNTIL this present occasion I have had little cause to ponder on the objects of veterinary education, so that my contribution to these discussions is likely to be rather raw than fresh and can hardly be expected to be refreshing. An account of objectives is in no way tied to what is immediately attainable and although some of the points raised may appear idealistic they may, nevertheless, appear reasonable if regarded merely as a guide to future development. My treatment of the subject is a wide one. It will give an indication of the approach if a slight change is made in the title, to read, "The Objects of Education in the Science of Veterinary Medicine"; it then conveys the idea of classification and of the order of importance that I should give to our aims: firstly *education*, secondly *inculcation of the scientific approach*, and thirdly *veterinary technology*.

Whoever begins to think of the education of the ideal veterinarian soon reaches the point of realisation that the most important step of all is the selection of the student. At the age at which a student enters the university his character is largely formed through what is inborn and what has been brought about by early environment. The universities' task is to build on that foundation to satisfy the interests that he has brought with him, to stimulate other interests and to develop his abilities. In the good old days—good only in a few respects—scholars picked themselves. It was only those who felt the urge to acquire knowledge who went to learn from the master. All that was required for the indoctrination of such scholars, and all that is required for the education of such students to-day is admission to a university and the provision of facilities; they will then make use of their time to good purpose and will develop their individualities in such a way as to be of the greatest use to the profession and to the community.

We live, however, in a post-war age of mass production in a world that has just realised the economic value of advancement in science. Fathers see the opportunity for their sons to make a good livelihood in the scientific field. Schoolmasters aid and abet the fathers in urging the intelligent boys along the prearranged channels that lead towards that vocation. There is a machine for the selection of a type of brain supposedly suited to the work. To make his way successfully through that machine the boy must learn to cram early. There is little time for mental growth in other directions, he must acquire ready-made knowledge, in order to be able to pass the tests. This is a time of the selection of the examination type, of scholarships rather than scholarship and the ousting of the individual who cannot conform. These aims are not the best.

If we had to pick on one factor as of outstanding value for our purpose in realising our objective in veterinary education, surely it would be that of a deep, inborn interest in learning, and a desire always to be acquiring more understanding and additional powers of appreciation. A man of that kind need not be of marked ability in the passing of examinations; so long as he has the urge to understanding and appreciation he will never cease to improve, and in the end may become a leader himself.

If it were possible to select such people for the filling of our colleges the rest would be a simple and a pleasant matter of pouring sweet wisdom into eager ears, but it is not possible. As a result, our veterinary schools contain only, at the most, some 20 per cent. of those who may be said to possess this compelling urge to scholarship. We should, therefore, acknowledge that we are dealing with two main types; the remaining 80 per cent. desiring only to acquire a vocational training. In this time of mass production there is a trend towards the vocational in university training which is formulated on a plan to fit the 80 per cent., with rules about "signing up" for lectures and an examination machine to compel the unwilling student to do a certain amount of work. I would suggest that these two types of students ought not to be forced along the same narrow groove to the end that they may pass an examination which, although of a very high standard, is in a rather narrow field. Each lecturer is full of zeal and of relentless determination that in his subject at least the student shall be proficient; as a result, the total amount to be learned for examination purposes becomes increasingly great and the student has little or no time for anything other than work

*This Symposium was delivered to the Association of Veterinary Teachers and Research Workers. The first four papers, published herewith, were read at the University of Liverpool Field Station, Leahurst, Neston, Wirral, on January 4th, and the remaining four at the University of Glasgow Veterinary School on April 1st. These will be published next week.

consisting very largely of the memorising of detail in preparation for a coming examination.

"Cramming"

In my opinion there is room for much improvement in the handling of the 80 per cent. Are we doing the best in requiring so much from the memory and asking for little of anything else in our examinations? It may be agreed that more than 90 per cent. of our work in a veterinary school is a matter of committing detail to memory. At one time, during the course of my student career, I was greatly privileged to sit under a certain Scottish professor of botany of Glasgow University, whose main objective in the tutelage of his students was to make them think. He was for ever asking for their opinions, for reasons and explanations, and in his examinations required only discussions, digests and analyses, the student being allowed to take any books into the examination room that he might wish to take. Undoubtedly he met with great success in the teaching of botany; it is true, however, that he was bristling with personality, and it is perhaps difficult to say how much of his success depended on that alone. In my opinion his method was far better than our present-day examination machine that works on memory alone, and some change in the direction of constructive thought would be much more likely to produce the thinking and understanding kind of graduate that should be our object.

Here I should like to digress for a minute, in order to give an example of the memorising in a narrow field such as is our speciality in this twentieth-century training machine. I suggest that our insistence on memorising the detail of the anatomy of the horse is very largely a matter of tradition. As far as understanding of the structure of the animal body goes (in contrast to a very detailed but rather temporary knowledge of one animal) might it not be better to spend a good deal of that time in comparative anatomy, as the zoologists do it?

The same might be said of physiology which should not be of the dog and the horse so much as the physiology of animals, with examples from birds, amphibians and fish, to help in the appreciation of the real nature of the various functions.

My student knowledge of anatomy was of the temporary nature to which I have just referred, and my examination technique was such that I was awarded distinctions in the examination. Now I know nothing and although there may be some vague experience value, brought about by having gone through the regime, it seems to me comparatively slight and that I should have derived more benefit from experience on a broader base. There is doubtless a difficulty in knowing what to leave out from the 600 or 1,000 pages of the standard text-book. These subjects, however, are continually growing; we shall have to draw the line some day and decide "so much and no more." Should it not be done now?

At the present time I am dealing only with broadening within the veterinary school of the university and as a further example of present tendencies in the direction of training in narrow traditional lines I should like to give an example of one notable omission. A large amount of work has been done in recent years on the subject of animal behaviour as a result of which a lot of information is available on the working of the animal mind and senses, yet it finds no place in our syllabus. In so far as our training goes the veterinary graduate has no more right to an opinion on the proper explanation of canine behaviour, or no more right to an opinion on the extent of cruelty involved in a particular set of circumstances than has any other person untutored in that subject. In so far as we may be concerned with the knowledge of the living animal surely this is a notable omission.

To reiterate; in my opinion our aim should be a wide understanding, to have learned something of the available knowledge, to be aware of a lot more, and to know where to find most of it in books. So long as the whole of our training is taken up in memorising the detail of the text-books of bacteriology or parasitology we are leaving ourselves no time for important matters of development in the wider cultural field.

So much for the 80 per cent. whose aim is vocational training. The regime through which they must go is a trying one. It is true that it must be so ordered as to force these students to work, for there are so many demands on youthful energies that they would otherwise do little or nothing in the academic line; but I am not at all sure that we are forcing them to work along the right lines and towards the best objective of thinking and understanding members of a scientific community. It seems clear, however, that the machine, as working in our schools to-day, is unsuited to the other 20 per cent. of students who have a spark of that desire for scholarship to which I have referred. By forcing these students along the lines of mass production we may be spoiling the best. I believe our object should be to foster the best, and that there should be more elasticity to permit of varied handling—some means whereby they may be encouraged to make the best use of their time in the university, not only in the school where their own particular technology is taught, but in other departments of university life as well. They should be given every opportunity of rubbing shoulders with students studying other branches of the sciences and the arts, and helped in their development along the line of scholarship where their abilities and inclinations lead.

Once again I recall my good fortune in having to deal with objects of veterinary education alone and realise how happy I am in being able to leave the methods of achievement to others. The aim should be the greatest possible freedom for the cultural development of this smaller group of students. Every opportunity should be given for the growth of individuality and the broadening of interests, understandings and appreciations of the science tradition and of the arts and philosophies that are the several concerns of fellow students across the quadrangle. This is the broad cultural basis on which we hope to meet others in our subsequent careers. It is a matter of learning something of the language and the appreciations of our fellows in other branches of science as well as becoming expert in our own field.

The Future Veterinarian

I come now to a second need for duality in our objective—this time from the professional angle. We must remember that we are endeavouring to produce graduates best suited to take their place in the veterinary field of the future. It is the rising generation that is our concern. The veterinary field is not the same as it used to be and it is a matter of the greatest importance that our educational endeavours should keep pace with a changing world. The rapidly-growing populations of the world are demanding, with ever-increasing insistence, to be fed on a scale that fits their elevated standards, and the time is hastening when we shall be compelled to see that the earth produces its maximum of food.

The governmental tendencies towards that end are clearly those of an ever-increasing central control, and there will doubtless be increasing organisation for the prevention of disease. Our veterinary researches continue to emphasise the widespread operation of predisposing causes and the great economic importance of the numerous sub-optimal conditions on the borderline of health and disease. Overcrowding, overmanuring, unnatural pastures, unbalanced diets, deficiencies and excesses all militate against the maintenance of animal health. If we draw a comparison with our confreres in human medicine there would be no doubt about it being our veterinary responsibility to advise on these matters; but are we ready to do so? Unfortunately our numbers are few and there are many in the allied fields of animal husbandry and agricultural chemistry who, although in many ways less well prepared, are willing to take over this work.

At the present time the field is relatively unoccupied. It is a kind of "no man's land" concerning factors in farming practice that favour disease, and it is waiting for the entry of workers trained in the study of disease. One of the recommendations of the English Hill Sheep Farming Committee was that "more attention should be given to comprehensive studies of methods to produce a greater degree of positive health as well as to detailed treatment for specific disease." The important work of the future will be in the field of preventive medicine and if we are to shoulder these responsibilities we must cease to concentrate so wholeheartedly on clinical medicine and prepare for greater activity in the aspect of animal husbandry that is concerned with health; in physiology, in genetics, in dietetics and in the all-embracing subject of animal hygiene. Where stock have ceased to thrive, or where, for instance, legislation is contemplated on the mixing of antibiotics or other substances with the food, it should rightly be the veterinarian who is called in to advise. Unless we devote more time to specific preparation to take over this work now, it will become the accepted understanding that it is done by workers without a training in animal disease which will put an unnecessary brake on progress.

This preparation implies a considerable change in our objective which up to the present has been that of producing good clinicians. One road to achievement might be through a division of students after the third or fourth year into two groups: those who are going to be clinicians and those who are going into advisory work or research. The Cambridge idea of a science degree at the end of the three years and special training after that, also appears to have much to recommend it. One thing of which I feel certain, however, is that the qualifying period should in no way be extended.

Finally, may I refer once again to the three steps in my revised title: (a) Education, (b) Science and (c) Veterinary technology, and place a last emphasis on the importance of acquiring a broad education and of avoiding tendencies towards a technological training. Many of our graduates, and particularly those preparing for research and advisory posts soon gravitate into administrative positions that require as much understanding of humanity as of veterinary science or technology, and such posts would be better filled by graduates who had made some contact with the humanities and the social sciences. I have referred to the importance of rubbing shoulders with students of other disciplines; I would suggest that we might even consider whether such contacts should not be given some direction and not be left to mere chance. Life is short, however; I realise also that there never will be any finality about education in a changing world. We cannot properly prepare for a future we do not know. We should beware, however, of holding too firmly to the traditions of the past, and be a little adventurous in our formulation of new objectives, and in our endeavours to arrive.

II—THE EDUCATIONAL POSITION OF VETERINARY STUDIES IN A UNIVERSITY

BY

C. W. Ottaway

Bristol

WITH the passing of the Veterinary Surgeons Bill in 1948 veterinary education in the United Kingdom became the responsibility of the universities; it is therefore not untimely to ask what is the educational position of veterinary studies in a university. There is no simple answer, and there may be no common practical answer to this question, each university will have its own special problems affecting the issue, but the most important prerequisite is common to all and is surely quite obvious—realisation that the position is as much a responsibility for the profession as for the universities. It is therefore very pleasing to note how soberly this fact has been accepted by all members of the profession, not only those charged with direct educational responsibility in the universities themselves. For them the task is not easy, but it can be very exciting; there is much to learn on both sides, and if accepted in that spirit the responsibility rapidiy becomes a mutual concern and the value more easily handed on to the student.

Apart from the direct scholastic values of this partnership, there are advantages—every bit as important educationally—which may be gained outside

the departments in what has been styled a "university atmosphere." They presumably include traditions and inspirations, an appreciation of a university system, and communal social and academic opportunities. Among them, too, is that much abused and often ill-defined word "culture" which seems to be regarded by some as a characteristic unnecessary to the life of a professional gentleman, although it may be admitted, if viewed in proper light and not confused with false values, as advantageous to the citizen in us.

For the vast majority the important time is as an undergraduate, for but few graduates become research workers or full-time members of staff. To these general values, then, must be added, as a main theme, appreciations which may be gleaned from the position of the teacher in the lecture room, laboratory or clinic, for the teacher is now more able to discuss and collaborate with others in formulating the principles and practice of teaching and research. This facility may be instrumental in effecting varying approaches to the teaching of many subjects; it may also introduce other possibilities, for example, the organisation of special lectures. It may be possible to stimulate university authorities to arrange a short course of lectures on subjects of interest to all students of the university, such as food and the world population. A veterinary member could most appropriately be one of the contributors. Of more specific scientific interest, a course on the history of science or medicine might be provided. Direct exchange of vocational interest is perhaps more practical, *e.g.*, the ophthalmic surgeon addressing the veterinary students on the eye, or the veterinary surgeon addressing the medical students on the viruses.

It may rightly be asked, however, are these suggestions practical? So far as the veterinary student is concerned they must be related to the location of the veterinary departments in the universities, and in many of these distance alone would prohibit. It is quite natural that all or a large part of the veterinary clinical departments should be distant from either the main university buildings or the veterinary preclinical departments, but unfortunately geographical separation often extends beyond this. Nevertheless, during the early years in some schools the students are in close contact with those studying similar disciplines, a facility which is shared equally by the staff. Clinical collaboration is certainly to be encouraged, and examples could be quoted of exchange of views even between geographically distant departments, particularly relating to research problems, as these involve individuals or small groups as opposed to classes of students. However, it is probably within the realms of the biological sciences, with which the universities are very familiar, that the greatest opportunities and values are presented for exchanges of procedure and experience both in teaching and research. There has been criticism in veterinary circles of the lack of research on fundamental problems in the basic sciences; the present position does and should continue to mitigate this criticism. If geographical contact obtains, every opportunity should be taken for the same teachers to conduct similar classes for general science, medical and veterinary students. There is, of course, the more vocational side of all the basic sciences, and provided the veterinary aspect is dealt with by the veterinary minded, and more often than not the veterinarily qualified, such an arrangement represents a true value of university association which more naturally leads to the essentially vocational interests dealt with in the clinical years. A geographical convenience or building set-up may lead to a particular school obtaining a reputation for a particular subject; this is not to be discouraged for its represents an excellent example of making the most of an opportunity.

This possibility, if the subject concerned is a preclinical one, introduces a new angle on a word which is rapidly coming to the fore—"specialisation." Although we may need clinical specialists it may be agreed that veterinary specialists in preclinical subjects such as physiology, pharmacology and animal husbandry are every bit as important. We have them already in pathology and bacteriology, but surely by no means enough in the others, as may be judged from the paucity of articles by veterinary authors in accepted journals. It may be remarked that the post-graduate scholar or budding specialist so enlisted will not work in isolation; in a university he is enabled to share his experience with a wider group of scholars. Hence post-graduate scholarship is more attractive and recruitment is advanced.

In the immediate post-Loveday era it was thought that the only possible association of a veterinary school with a university was that of full faculty status. In universities where such a procedure is possible this indeed may be the ultimate aim, an aim which the Veterinary School of the University of Liverpool has attained, but experience suggests there need not be any violent hurry to achieve this end. There is a tremendous value in learning gradually how a university works; it is a complex machine with established ordinances, regulations, customs and traditions, which have been slowly built up and may only be adapted to the particular needs of a faculty in the course of time. Provided there is mutual collaboration, a veterinary board which contains also members of science and medical departments—which types of teacher, incidentally, should also be members of a veterinary faculty—is a sound institution, and experience suggests that a board within another faculty works very well and provides yet another example of educational values.

The establishment of an educational position in the universities has by no means been restricted to advantages to the veterinary profession. In the main members of universities had little knowledge of veterinary matters; they have not only learned more about the existence of a vigorous profession, they have gained considerably from contact with its members. For the human pathologist, physician or surgeon it is of great interest and value to hear of similar ailments in animals; the agriculturist, too, has learned much. It is also a fact that the experimental tool of the biological sciences is the animal, and it is quite remarkable how little knowledge many biologists have of animal form, function and way of life in the truly

ecological sense. Further, it may be said that members of the universities have learned from their veterinary colleagues matters other than the purely vocational. Members of the veterinary staff are valuable members of university committees, and active participants and organisers of university scientific and social discussions.

It was suggested there would be a danger of the profession losing its identity once the schools joined the universities; there is, however, no apparent evidence of this, indeed the identity of the schools within the universities has been maintained, and this is a most important feature reflecting credit on the profession. The fear of being patronised or saturated or made improper use of by the universities is ill-founded; the benefit is mutual, the value of the profession to the universities has been amply demonstrated, it is an association long overdue. The essential feature of this association is a well-balanced school within a university, and the time will surely come, if it has not already arrived, when veterinary studies become as much an integral part of the participating universities as any other faculty. Veterinary graduates have always been proud of their schools, their Alma Mater, and there is no reason why this pride should not continue.

III—THE CONSTRUCTION OF A SYLLABUS

BY

R. Lovell

Royal Veterinary College

IN St. Luke's Gospel, xiv, 28, we read " For which of you, intending to build a tower, sitteth not down first, and counteth the cost, whether he hath sufficient to finish it?"

This quotation has a direct bearing upon my part of the discussion as well as one from *Civitas Dei* (Curtis, L. 1937. **3.** 3) " . . . a military leader whose strategy is sound can afford to commit tactical blunders; but no tactical skill can save a military leader whose strategy is wrong. Commanders of regiments and warships, and even of armies and fleets, become so absorbed in the technical task of manoeuvring their units that they lose sight of the ultimate aim of the war. They are mere tacticians. The strategist is the leader who never forgets the ultimate aim of the war." All this means that there must be some clear view of the ultimate object one seeks to attain before plans are discussed. Ingenious and elaborate plans and syllabuses lead nowhere unless they are subordinated to the attainment of an ultimate object.

What is our ultimate object?

The creation of veterinary surgeons who will be able to practise their profession in whatever branch is chosen; this means that post-graduate study and experience are necessary but the qualified veterinary surgeon should be so equipped as to be able to profit by these additional studies and experiences; the qualified man should therefore have had training in the fundamental principles of every branch of veterinary science.

A veterinary surgeon is one who is skilled in the medical and surgical treatment of domestic animals. The different branches of specialism includes: general practice, field inspection and control of epidemics and major diseases, research work in laboratory or the field, and teaching combined with research. These occupations may be followed in this country and overseas.

A veterinary syllabus should therefore be designed to give adequate training to an individual who, having completed that training, may embark upon further study or experience so that he may practise in any of the branches so envisaged.

A syllabus must be looked at from the finished product backwards and the object must be the pinnacle of the plan—and yet it is its beginning. Let us start from a consideration of the training in the medical and surgical treatment of domestic animals—and this entails a knowledge of diagnosis, and pathology—towards an understanding of disease problems. That in its turn implies a knowledge of the aetiology of disease and so we have one large integrated subject, " disease, its treatment and prevention." However much we divide it, the syllabuses and the teaching must be so interwoven that it is viewed by the student as one subject. A lesion described in pathology classes should be linked with the symptoms discussed in a clinical class. There must be no divorce. One section of our syllabus is thus "disease" and its implications. It follows inevitably that " disease " and its implications cannot be understood unless a student understands the normal structure, function and behaviour of domestic animals. Therefore the preceding section must be a consideration of " anatomy, physiology and husbandry " of domestic animals. There must be close integration in these subjects and no separation of function, behaviour and structure should exist in the mind of the student. Structure may be influenced by function and the function of a limb may influence its structure. Thus in the pre-clinical years the syllabuses must be interwoven.

This study demands an adequate knowledge of fundamental and exact sciences such as chemistry and physics with an understanding of biology and biological principles.

Our main plan is now complete—a broad base of the fundamental sciences leading to the pinnacle—that pinnacle of " one skilled in the medical and surgical treatment of domestic animals." It is not our job to train anatomists, physiologists, bacteriologists, biochemists, nutritionists or even skilled operative surgeons and physicians. It is our job, so to fit our graduates that they may profit adequately from further study and experience. The training must be liberal in outlook and broad in conception.

The plan is therefore plain and straightforward:—

1. Preliminary sciences.
2. Preclinical subjects.
3. Clinical training, including pathology and its ramifications.

The details are not so important. The aim and the finished product is the important aspect. If the design is to " turn out " veterinary surgeons for practice in temperate climates then there may be a slightly different bias in the clinical years from that if it is designed to train men for work in tropical countries.

Details which may be found in a syllabus

In former days, when the R.C.V.S. looked upon teachers with suspicion and the examinations were conducted solely by external examiners, the syllabuses were given in great detail. Even to-day some provide too much prevision. Let us compare the syllabus in biology in the R.C.V.S. with that in the B.Vet.Med. (University of London); the R.C.V.S. give theirs in over 1,000 words, the University of London in 35 words. Within recent years, and especially in universities, the examinations are largely in the hands of the teachers and the external examiners are expected to act as moderators. Teachers are experts in their own subjects and a loosely phrased syllabus gives more flexibility in teaching and may be orientated towards the ultimate objective more readily. We are nowadays spared the incongruities which sometimes occur when syllabuses are drawn up by men who are not teachers.

There is one further point I would make. Veterinary students must be as well acquainted with domestic animals as doctors are with man. Thus the subject of animal management, animal husbandry and the general care of animals must be considered separately from the other defined subjects. This is a background, which can be acquired, rather than formal instruction. The student should be encouraged to handle animals and acquire that experience throughout his course of study. In the veterinary curriculum, it should be a background or theme rather than a course of study and provision should be made for it from one's entrance to the college.

The preliminary sciences should be taught with the ultimate objective in view. This is clearly an ideal, and students should be encouraged to study them at a veterinary school or college, and not enter direct into the second year of the course.

The provision of veterinary surgeons is our job. Let us orientate all of our activities in teaching to that objective.

IV—SELECTION OF STUDENTS

BY

J. G. Wright

Liverpool

BEFORE proceeding to discuss the selection of students I propose to refer to the progress made by students in the Liverpool School since 1942, for that was the time when the selection of applicants by interview was commenced.

It will be noticed that of the 205 men concerned, 171 (83.4 per cent.) subsequently qualified and that while the total wastage was 16.6 per cent., 10 per

TABLE I

MEN.—(EXCLUDING COLONIAL OFFICE NOMINEES)

Year	Admitted	Qualified	Relinquished degree	Unsatisfactory
1942	15	14	4	1
43	19	16	3	2
44	17	15	3	2
45	21	18	3	1
*	23	22	6	1
46	26	23	6	2
47	28	21	5	3
48	27	17		7
49	28	24		2
Total	205	171		21

* Pre-war students who joined the forces during their course and returned.

Overall per cent. of entry who qualified	—	83·4
Per cent. of entry who have qualified on registrable degree	—	74
Per cent. sent down for unsatisfactory progress	—	10

TABLE II

WOMEN

Year	Admitted	Qualified	Relinquished degree	Unsatisfactory
1942	2	2	–	–
43	6	2	1	1
44	6	6	2	–
45	7	4	1	3
*	1	1	–	–
46	–	–	–	–
47	2	1	–	1
48	1	1		–
49	2	2		–
Total	27	19		5

Per cent. of entry who qualified	—	70
Per cent. sent down for unsatisfactory progress	—	18·5

TABLE III

COLONIAL STUDENTS

Year	Admitted	Qualified	Origin of those who qualified	Unsatisfactory
1945	2	–		2 Mauritius Honduras
47	1	1	Palestine Arab	
48	2	1	Jamaica	1 Sierra Leone
49	1	1	Nigeria	
Total	6	3		3

Per cent. of entry who qualified	—	50
Per cent. sent down for unsatisfactory progress	—	50

cent. of this was due to unsatisfactory progress in studies. It will also be seen that during the period 1942-7 when it was compulsory for students to read for the membership diploma of the R.C.V.S., as well as the B.V.Sc., degree of the University, that 20 per cent. relinquished the degree course because, in the majority of instances, they had fallen behind in their degree examinations. Since the University has been awarding a registrable degree 74 per cent. of the entry have graduated but as figures for two years only are available, undue emphasis must not be placed on this.

From Table II it will be seen that the wastage among women students was higher than in men (30 per cent.) and also that the proportion sent down for unsatisfactory progress was higher (18.5 per cent.) but here again the numbers involved are too small to draw firm conclusions. Nevertheless my experience over many years as a teacher has been that a higher proportion of women fall by the wayside than do men. I think there are several special reasons for this; falling in love is one of them. Byron was right when he implied that this was more likely to upset the even tenor of woman's existence than of man's. But there are others; girls when living at home have often to carry out domestic duties, moreover when there is illness at home it is the girl who is called upon.

TABLE IV

COMPARISON OF GRADING AT INTERVIEW WITH SUBSEQUENT STUDENT CAREER

YEARS 1942—49

Grading	Number admitted	Subsequent course		
		Straight	Failures	Unsatisfactory
Very good	24	18 (77 per cent.)	6	–
Good	110	38 (34 per cent.)	54	15 (14 per cent.)
Very fair	41	12 (29 per cent.)	27	3 (7 per cent.)
Fair	18	7 (38 per cent.)	7	3 (18 per cent.)

Per cent. of respective gradings—

Very good 12·4 Good 56·5 Very fair 21·2 Fair 9·3

Overall per cent. without exam. failure — 38·8

Overall per cent. including one failure — 52

On reviewing the progress made by students during their course, it will be seen that 38.8 per cent. completed it without an examination failure, and if a single failure can be regarded as relatively accidental then 52 per cent. have shown themselves to be quite satisfactory. The remainder had more than one failure. Having regard to the high numbers who have been applying for entry, particularly since 1945, and also the care taken in their selection, I regard this result as disappointing.

On comparing students' careers with the grading they were given at interview, I find the only group of significance to be the one regarding which the interviewing committee was enthusiastic. I have tabulated them as " very good "; their school examination results were exceptional while at interview they showed by their answers to questioning that their schooling had meant more to them than mere preparation to pass examinations. This group comprised 12.4 per cent. of those admitted, and of them 77 per cent. had an uninterrupted career, while none was found to be unsatisfactory. Between the remaining gradings there were no significant differences; about 30 per cent. were unchecked.

Having regard to the fact that all students admitted to the School have attained matriculation standard, in fact the majority of them have attained a standard considerably higher than bare matriculation, it is of interest to consider the causes of these chequered careers. Lack of ability is, I think, responsible for few only and in this connection I think it likely that the persons concerned are square pegs in round holes and have plenty of ability in other directions. Many find regular and consistent study a burden; distractions are irresistible and it is not until an examination is in the offing that they apply themselves to serious study, by which time they find themselves unable to cope both with current work and that of previous terms. Not infrequently they do quite well after the additional time a failure entails. In this connection our examinations at Liverpool are so arranged that all the parts of a main examination are taken at one time; for example, anatomy with histology and embryology, and physiology with biochemistry are taken together, as also are animal husbandry with genetics, and pathology, microbiology and parasitology. Our object is that the student shall study these subjects consistently and together rather than concentrate on a single part which is to be examined first. Moreover, no student is permitted to proceed to the study of later subjects until he has passed all the parts of the examination of the earlier ones. By eliminating " stepping stones " as far as possible I believe that education has been improved although I must acknowledge it has tended to increase the proportion of examination failures.

Other students spend more time than they can afford in student activities. This is a difficult matter; it is highly desirable that our students should play an active part in the general student life of the university and we, as teachers, should encourage it. Nevertheless, our course is such a wide and comprehensive one that it is most important the student shall carefully balance these activities with study according to his ability.

There are also, of course, variations in the degree of interest that a particular subject has for a student and in this connection those of us who teach for the final examination are particularly fortunate. At this stage in their career students are most eager to practise their profession and the work they do with us appears, if nothing else, to be closely related to such practice.

Finally the occasional neurotic student we encounter comes to mind, and I think these are more common to-day than they were 25 years ago. The intensity of our present educational system whereby children from the age of 11 onwards are almost

continuously preparing for examinations, to which is often added parental pressure that they shall do well now that public money is available to send them to a university, sometimes results in the student being utterly exhausted mentally when he reaches us.

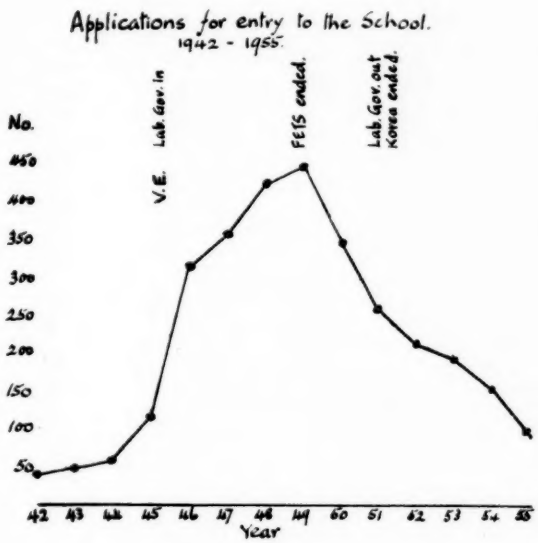
In our selection of students we have, as I see it, a dual duty. The first is to choose those most likely to attain the necessary academic standard for the award of the degree, and the second, to select those likely to make the best veterinary surgeons, using the word " best " in its most comprehensive meaning.

Our Selection Committee is made up of three or four members of the Faculty together with one or two members of other Faculties: the Schools of Education, Law, Medicine or Engineering. Among the matters we endeavour to explore at interview are: What has the applicant's school education meant to him? Has he regarded it as a training to enable him to live a full and useful life, or has its essential purpose been the passing of the necessary examinations to reach matriculation standard? Has he the temperament and mental stability to embark on a long and arduous course of university studies? Is he a reader and is it likely he will continue to regard himself as a student after he has graduated? Is he genuinely attracted to animals and to the pursuits of the countryside? Is he observant?

After a considerable experience of assessing schoolboy records, I have come to the conclusion that for the purposes of an education in veterinary science, the longer a scholar's education has been on broad lines the better. The study of our language and our literature, of history or of geography, of a classical or a modern language, is as important a preliminary to a professional education such as ours as is the study of the immediately useful sciences, chemistry, physics and biology. I believe we should seek students who have been trained to read and have come to love reading; who have been taught to seek information for themselves and be critical in regard to it. For years there has been a tendency for schoolboys wishing to enter the medical profession or our own to abandon these humanistic studies after the age of 15 or so and to confine themselves solely to the three sciences. The professions have in large measure been responsible for this by giving exemption from the first year of study to boys who have obtained the H.S.C., or G.C.E. (A) in these subjects. In an attempt to overcome this we, in Liverpool, give no exemption from any of the subjects of the first examination nor have we any special Faculty subject requirements. My own opinion is that during his period in the sixth form a boy's studies should be something of the following: a science, English or history, and a classical or a modern foreign language. The other two sciences might well be left, for the time being, at G.C.E. (O) level. One further point I would make in regard to school examination results is the necessity for scrutinising the marks obtained, for an applicant with a bare pass in the subjects he has taken at " A " level is unlikely to make the grade we require.

In reply to the question, " Why do you wish to become a veterinary surgeon? " we so often receive the glib reply, " Because I love animals." More than this is required. The applicant should, by his answers, show that he has taken an intelligent interest in the animals with which he has come into contact. He should also show that he appreciates something of the significance of his schoolboy study of zoology, botany, chemistry or physics in relation to the profession he seeks to enter.

It is not easy at this stage to assess an applicant's fund of common sense, yet for the efficient practise of our profession this is not the least of the requirements. The budding genius whose feet as well as head are in the air may be dangerous.



Finally a word about the future. From the graph it will be seen that while there was a steep rise in the number of applications for entry into the School from 1944 to 1949, since that time there has been an almost equally abrupt fall. In so far as 1955 is concerned I anticipate that we shall receive about 100 applications of which about 60 will have a preference for this School if selected (in this connection it must be noted that the majority of those seeking places apply to more than one school). Of this 60 it is unlikely that more than 45 will attain the necessary matriculation standard, so that the breadth of our selection will be relatively narrow if we are to continue to fill our 30 places. I think it likely that this fall in the number of applications will continue and that a few years hence schools may have difficulty in filling their places even without selection and that if selection is continued the numbers entering the profession from universities in the United Kingdom will be considerably less than those anticipated in the Loveday Report.

I have said a good deal about academic standards but now, in a final word, I would remind you that in the days before the Act the Royal College gave concessions to many applicants who did not attain matriculation standard. It must be acknowledged that some of our best men were among them.

Variations in the Quantity and Composition of Milk Yielded by Diseased Cows while their Body Temperatures were Elevated

BY

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The Literature

THE literature gives a rather wide range for the normal body temperature of dairy cows. Regan & Richardson (1938) consider 101° to 102° F. as normal. Gaalaas (1945) found the average of 221 readings was 101.06° F., with a range of 99° to 102.3° F. Hobday (1896) placed the temperature of adult cattle at 101.3° F., with a physiological range from 100° to 102° F. Ritzman & Benedict (1938) who carried out long-term observations on seven Holstein and four Jersey cows, stress the remarkable constancy of the rectal temperature. The highest rectal temperature which they recorded was 102.2° F., the lowest was 99° F., and the mean, which was based on 1,000 individual records, was 100.8° F. Grant, Millar & Worden (1942) found that the morning temperature of 26 Ayrshire cows in various stages of lactation over a period of eight weeks were almost always between 99.8° and 101.6° F. (range of means 100.4° to 101° F.), while the afternoon temperatures were, with few exceptions, between 100° and 102° F. (range of means 100.8° to 101.5° F.). In only one case did the temperature of an otherwise clinically normal animal rise appreciably above 102° F. This cow showed morning and afternoon temperatures of 103.1° and 103.5° F. respectively. The reason for this discrepancy was not apparent, as the animal fed and milked normally. From these findings it would appear that the body temperature of healthy dairy cows does not normally rise above 102.3° F.

As there are relatively few references showing the effects of raised body temperatures on milk composition the literature reviewed has been extended to include work which has shown that environmental temperatures can influence the body temperature of cattle, and that environmental temperatures also influence the yield and composition of cows' milk. These results indicate the possibility of an association between body temperature and milk composition. Many workers have shown that environmental temperatures can influence the body temperature of cattle. Seath & Miller (1946b), working with cows in the Louisiana State University dairy herd, found that changes in air temperature were the major cause of increases in body temperature, and that one degree increase in air temperature was responsible for from 13 to 15 times as much increase in body temperature as was an increase of 1 per cent. in humidity. Gaalaas (1945) found there was a definite relationship between the body temperature and the air temperature. The average body temperature ranged from 101° F. at an average air temperature of 50° F. to 103.2° F. at an average air temperature of 95° F. Similar results were obtained by Seath & Miller (1946a) working with Holsteins and Jerseys, who obtained a steady rise from 101.7° F. at an air temperature of 73° F. to 103.5° F. at 86° F. Regan & Richardson (1938) who with Jerseys obtained a rise from 101.3° F. at an air temperature of 70° F. to 105.1° F. at 100° F. Freeborn, Regan & Berry (1934), also working with Jerseys, who showed a rise from 101.5° F. at 75° F. to 103.1° F. at 85° F.; and Bonsma, Scholtz & Badenhorst (1940) who obtained a rise from 102.9° F. at 81° F. to 106.2° F. at 100° F. for Aberdeen Angus cattle, and 102.2° F. at 81° F. to 103.4° F. at 100° F. for Herefords. These records show clearly the steady increase in rectal temperature obtained with increasing air temperatures, and suggest that 84° F. may be the critical air temperature for cattle, as the body temperatures recorded were all above 102.5° F. at that temperature, and, in most cases, rose more steeply above than below it.

Brooks (1895) testing the reactions of cows to abnormal circumstances found that when a cowshed was heated and shut up to check ventilation so that the air temperature rose to over 80° F. the body temperature rose, the yield dropped, the fat percentage rose, and the solids-not-fat percentage dropped. Bartlett (1935), studying the effects of environmental temperatures ranging up to between 85° and 88° F., found that the body temperatures became less regular, and often showed considerable increases. These increases in most cases resulted in the maximum temperatures recorded being over 102.5° F., the highest figure being 104.4° F. He found that the yields dropped in two of the four cows, and considered that the average daily loss of 0.161 lb. of milk could be ascribed to the high temperature. He also found that at these temperatures there was an increase in fat percentage in the milk of three of the four cows, although a marked reduction in the case of one cow was sufficient to reduce the average figure by 0.044 per cent. Neither of these changes was significant. There was an average decrease of 0.153 per cent. of solids in the fat-free milk, ascribable to the high temperature. All four cows showed a reduction, and the figure was significant. Regan & Richardson (1938), studying the effect of controlled environmental temperatures at constant humidity and air movement on the yield and composition of the milk of Jersey cows, found that the yield fell steadily as the environmental temperatures rose from 40° to 95° F., and that the solids-not-fat percentage showed a steady drop. The fat percentage rose when the environmental temperature was over 80° F. Ragsdale,

Brody, Thompson & Worstell (1949), working with Holstein and Jersey cows, investigated the effect of air temperatures from 50° to 105° F. on milk production in dairy cows. They found that the critical high temperature at which the depressing effect on milk production became evident was 75° to 80° F. for Holsteins and 80° to 85° F. for Jerseys. Increasing environmental temperatures above these temperatures rapidly decreased milk production till at 105° F. it ceased. Reducing the temperature to 50° to 60° F. restored normality. Findlay & Beakley (1954) record that when European cows were subjected to rising temperatures from 80° to 90° F., increases occurred in the total solids and chloride contents of the milk, and decreases in the contents of lactose, total nitrogen, and total non-fatty solids. The increase in total solids was due almost entirely to the increase in the perecentage of fat which accompanied a decrease in yield.

These workers all show that at environmental temperatures over 80° F. the yields are reduced; the four analysing milk for solids-not-fat percentage show that this is reduced; three show that the fat percentage is raised, and the fourth shows that it is raised for three cows out of four; and the one taking body temperatures shows that these are raised.

Experimental

From the results given in the literature cited earlier, and from observations made on diseased cows admitted to the hospital for treatment and seen on the farms associated with the Field Station, it has been concluded that the temperature of a dairy cow at rest, if not taken immediately after feeding or milking, can rise to 102.4° F. before the incidence of disease is suspected, but that a temperature of 102.5° F. or over indicates that some abnormality may be present. The effects which temperature has on milk composition have been considered in the following temperature ranges: 104° F. and over, between 102.5° and 103.9° F., and 102.4° F. and under.

The 28 cows from which milk samples were taken were all in-patients in the hospital block at the Veterinary Field Station in the period 1949-53. In 12 animals (Group 1) temperatures in all three of these ranges were recorded, and in the other 16 (Group 2) temperatures in the 102.5° to 103.9° F. and the 102.4° F. and under ranges only were encountered. Details of the breed, age, disease condition and number of records made are given for each cow in Table I. A record was made only if consecutive morning and evening body temperatures were both in the same range.

The temperatures were taken by inserting a stub-nosed thermometer into the rectum to a depth of between 8 and 9 cm. and keeping it in position for approximately one minute. Care was taken to see that the thermometer came into contact with the rectal wall, and was not embedded in faecal matter.

TABLE I—DETAILS OF THE COWS FROM WHICH MILK SAMPLES WERE EXAMINED, AND THE NUMBER OF RECORDS MADE

Case Number	Breed	Age	Disease condition	Number of records made in each case		
				Temperature range		
				104° F. or over	102·5° to 103·9° F.	102·4° F. or under
Group 1						
1	Friesian	2nd calf heifer	Caesarean section	2	3	7
2	"	1st " "	" "	1	1	6
3	Shorthorn	" " "	" "	1	2	2
4	Ayrshire	" " "	" "	1	2	4
5	Friesian	" " "	" "	1	1	2
6	Shorthorn	" " "	" "	1	1	1
7	Friesian	" " "	Post parturient pyrexia	1	1	3
8	Ayrshire	Cow	Rumenotomy	2	1	7
9	Friesian	"	Amputation of the digit	1	1	6
10	"	"	Rumenotomy	2	1	7
11	Ayrshire	"	"	1	1	1
12	"	1st calf heifer	Abscess of the hock	1	1	8
Group 2						
13	Friesian	2nd calf heifer	Caesarean section		6	6
14	"	Cow	" "		2	3
15	"	2nd calf heifer	" "		1	7
16	Friesian	1st calf heifer	" "		3	7
17	"	Cow	Suspected traumatic reticulitis No rumenotomy		2	3
18	Ayrshire	"	Rumenotomy		1	2
19	Friesian	"	"		2	2
20	Ayrshire	"	"		2	5
21	Friesian	1st calf heifer	"		1	7
22	Holstein	Cow	Ruminal fistula		2	6
23	Friesian	"	Rumenotomy		2	3
24	Ayrshire	"	"		1	2
25	"	"	"		2	1
26	Friesian	"	"		1	1
27	"	1st calf heifer	"		1	5
28	"	Cow	"		1	3

The thermometers were marked in degrees Fahrenheit from 95° to 110° in units of 0.2 of a degree, the distance between the markings being about 0.8 mm. The temperatures were taken before, and not after, milking so as to give an estimate of the temperature of the cow at the time when the milk was produced. The fact that the cows were milked at about the same time each morning and evening ensured that there were no great differences in the time of day when the temperatures were recorded.

The greatest possible care was taken to see that factors, other than disease, known to affect the composition of milk did not have any influence on the samples examined. All figures for yield, fat percentage and solids-not-fat percentage, are the average of a consecutive morning and evening milking.

1. All the cows were milked between 8.30 and 9 a.m. in the morning, and 4 and 4.30 p.m. in the evening, and the same milking routine was followed each time.

2. After milking the milk was thoroughly mixed, and then sampled with a long-handled dipper.

3. Both breed and individual variation have been allowed for as the milk analyses at different temperatures have been compared for the same cow.

4. The fact that the cow's lactation was advancing would tend to alter the composition slightly, but as the observations for each individual were made over such a short period, the effect would be unimportant.

5. The environmental temperature did not greatly change during the period any cow was being treated.

6. A standard ration consisting of a proprietary brand of concentrates and hay was fed at all times.

7. Samples were not taken from cows which were not eating.

8. No sample was taken on the day of arrival to avoid the effects of the disturbance of travelling.

9. No hormones or drugs known to influence the composition of milk were used on the cases investigated.

10. In those cases in which caesarean section operations were performed milk samples were not taken until the fifth day after the operation so that the cows were yielding normal milk, and not colostrum.

11. Milk samples from cows showing clinical signs of mastitis or containing clots were not included.

The fat percentages were determined by the B.S.S. No. 696 (1936) Gerber method, and the solids-not-fat percentages by the B.S.S. No. 731 (1937) density method.

Results

Yield

From Table II it can be seen that a rise in body temperature was accompanied by a fall in milk yield. In all animals, except one when it remained constant, there was a rise when the high temperature dropped to the 102.5° to 103.9° F. range and without exception, the yields rose again when the temperature became normal. The differences in the means of the three groups were significant at the 1 per cent. level. In group 2 (Table III) every cow increased in yield when the temperatures became normal, and the difference in the means was again significant at the 1 per cent. level.

Fat

In all the 12 cows in group 1 (Table II) the highest fat percentages were recorded while the temperatures were 104° F. or over and the difference in the means between the fats at this, and the 102.5° to 103.9° F. range, was significant at the 1 per cent. level. In 10 of the 12 cases the lowest fat percentages occurred while the temperatures were below 102.4° F., but the difference in the means between this and the 102.5° to 103.9° F. range was not significant. In group 2 the highest fat percentages were recorded while the temperatures were over 102.5° F. in 12 of the 16 cases, and the difference in the means was significant at the 1 per cent. level.

Solids-not-fat

In group 1, in all cases except two, the lowest solids-not-fat percentage was recorded while the

TABLE II

THE AVERAGE MILK YIELD, FAT PERCENTAGE AND SOLIDS-NOT-FAT PERCENTAGE FROM CONSECUTIVE MORNING AND EVENING MILKINGS OF THE TWELVE COWS IN GROUP 1

	(1) Temperatures of 104° F. or over	(2) Temperatures of 102·5° to 103·9° F.	(3) Temperatures of 102·4° F. and under	Standard Error
Average yield (lbs.)	13·06**	17·46†	23·13	±0·80
Average fat per cent.	5·36**	4·08	3·74	±0·20
Average S.N.F. per cent.	8·27*	8·68	8·62	±0·12

Difference in the means of columns (1) and (2):
* Significant at the 5 per cent. level of significance.
** Significant at the 1 per cent level of significance.

Differences in the means of columns (2) and (3):
† Significant at the 1 per cent. level of significance.

TABLE III

THE AVERAGE MILK YIELD, FAT PERCENTAGE, AND SOLIDS-NOT-FAT PERCENTAGE FROM CONSECUTIVE MORNING AND EVENINGS MILKINGS OF THE SIXTEEN COWS IN GROUP 2

	(1) Temperatures of 102·5°to 103·9° F.	(2) Temperatures of 102·4° F. and under	Standard Error
Average yield (lbs.) ...	17·43	23·19	±0·80
Average fat per cent. ...	4·53	3·94	±0·13
Average S.N.F. per cent.	8·25	8·47	±0·03

Differences in the means of the two columns were all significant at the 1 per cent. level of significance.

temperature was in the highest range and the difference in the means between this and the 102.5° to 103.9° F. range was significant at the 5 per cent. level. In four of the 12 cases the solids-not-fat percentage was higher in the 102.5° to 103.9° F. range than in the normal temperature range. The average in this temperature range was also greater, largely due to the marked difference in two of the cases. The difference in the means, however, was not significant. In group 2 the lowest solids-not-fat percentages were recorded when the temperatures were in the range between the 102.5° and 103.9° F., except in two cases, and the difference was significant at the 1 per cent. level.

These findings show that the changes which occurred followed the same general pattern as those recorded in the survey of the literature where it was shown that at environmental temperatures over 80° F. the yield was reduced, and the solids-not-fat percentage was decreased, and that, in the majority of cases, the fat percentage was raised.

Summary

The results of the examination of milk samples from 28 cows, which were in-patients at the Veterinary Field Station and which developed raised body temperatures, have been recorded. The association between body temperature and milk composition has been considered in the following temperature ranges: 104° F. or over, from 102.5° F. to 103.9° F., and 102.4° F. or below. The results show that a rise in body temperature is accompanied by a fall in yield, and that there is a tendency for the fat percentage to increase and the solids-not-fat percentage to decrease as the body temperature rises.

Acknowledgments—The writer wishes to thank Professor J. G. Wright for allowing the work to be undertaken, Professor E. G. White for helpful advice, Dr. M. E. Castle for carrying out the statistical interpretation of the records, and Mr. B. Burrows and the other members of the lay staff of the Veterinary Hospital for taking the body temperatures of the cows, and collecting the milk samples.

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Veterinary Education—*Concluded.*

be a real call for facilities to study Animal Behaviour as a subject.

The provision of clinical material is a problem in all schools, and it is to the good that different methods of supplying this material are being tried. As far as the foreseeable future reveals itself it is clear that a good grounding in clinical methods must be the final stage of any British veterinary student's education. A division of the course in its later stages, according to the ultimate employment of the students, would be dangerous in the extreme.

If the schools are to avoid the perils of undergraduate specialisation, they must make some provision for post-graduate training to fit applicants for the increasing number of specialist appointments now available. In research too many of the new entrants are taking up posts without adequate technical training in their particular subjects, and they are expected to pick up such knowledge as they pursue their researches. Such a policy will have serious repercussions on the quality of research in the future.

Veterinary education is entering into a period of expansion; inevitably it is also faced with problems of some complexity: free discussion, careful analysis and a variety of approaches to these problems can only result in strengthening the very foundations of our profession.

THE COMMONWEALTH BUREAU OF ANIMAL HEALTH

It is announced that Mr. W. A. Pool, director of the Bureau for the past 25 years, has retired as from May 26th. He is succeeded by Mr. M. Crawford, who has been assistant director for 10 years. Mr. Crawford, who qualified in Dublin in 1923, first joined the Colonial veterinary service, becoming head of the veterinary department in Ceylon. It was after his retirement from that post that he became assistant director of the Bureau.

Mr. Pool served in the Commonwealth also spending 12 years in the Indian veterinary service, and serving in the Indian army in the first world war. He later was appointed second veterinary officer in the Imperial Bacteriological Laboratory at Muktesar, where, for the last 18 months of his service, he officiated as director.

After leaving India he studied at the Pasteur Institute in Paris and the Molteno Institute for Parasitology at Cambridge under the late Professor G. H. F. Nuttall. Later Mr. Pool joined the Animal Diseases Research Association under the late Professor Daiger, whom he succeeded as director. His last appointment was to the directorship of the Commonwealth Bureau at Weybridge, a post he has filled with distinction for a quarter of a century.

University News

Diploma in Tropical Veterinary Medicine

Recommencement of Edinburgh Course

Overseas readers may be interested to learn that the University of Edinburgh has decided, with the encouragement and support of the Colonial Office, to reintroduce next session the post-graduate course leading to its Diploma in Tropical Veterinary Medicine.

The course, which was revised and brought up to date following Professor Robertson's tour of Africa a few years ago, is on similar lines to that which was run successfully by the University of Edinburgh in collaboration with the Royal (Dick) Veterinary College from 1930 until 1939. It will run from January till June and has been divided, as before, into two distinct parts so that candidates who have passed the examinations at the end of the first half may interrupt their studies and take the second at a later date.

Part I will consist largely of advanced studies in the various fundamental sciences—Pathology, Bacteriology, Parasitology, etc., with special reference to their tropical applications, while Part II will be more of an applied nature dealing mainly with epidemiological and animal industry aspects of tropical veterinary work, laying stress on recent advances in our knowledge of animal husbandry and of disease control. The syllabus has been designed so that the course may be of value to various categories. It should be of assistance to veterinary officers recruited in this country who wish post-graduate instruction in tropical veterinary medicine either before or after proceeding abroad and it may be taken partly before an officer's first tour of service and partly at some later date. Attention has also been paid to the requirements of veterinary surgeons trained abroad who wish to come to this country for post-graduate studies in disease control measures adopted here and abroad and in the application to tropical conditions of the latest developments in animal breeding, nutrition and husbandry.

It is hoped that this revised D.T.V.M. course will not only provide a prompt and reasonably satisfactory solution to a number of urgent problems in relation to post-graduate veterinary education but that it will serve to provide a meeting ground where veterinary surgeons from this country and from the Colonies and Commonwealth as well as from other countries abroad can discuss their problems and share their experiences to the benefit of all.

The Association of Veterinary Students

The following members of the Association of Veterinary Students have been elected as Office-bearers for the year 1955-56.

President: Donald R. Banks, Esq. (Cambridge).
Vice-President: E. Pickering, Esq. (Glasgow).
Treasurer: C. J. Allison, Esq. (Glasgow).
Secretary: L. B. Smith, Esq. (Glasgow).
Editor of Journal: J. N. Taylor, Esq. (Glasgow).

Current Literature

BOOK REVIEWS

The Farm as a Business. A Handbook of Standards and Statistics for use in Farm Management Advisory Work. H.M.S.O. Price 4s.

In industry most of the factors affecting production are, more or less, under the direct control of the manufacturer. Long term planning can be worked out in detail, costs of production can be computed relatively easily and the general efficiency of the enterprise can be assessed with a fairly high degree of accuracy.

In agriculture, on the other hand, the farmer's produce is in the form of living things, or by-products therefrom, grown for the main part in, or on, a living medium, the soil, the behaviour of both of which, due to the perversity of nature, is, at least, to some considerable extent unpredictable. With the weather, completely uncontrollable, added as a further complication it at once becomes apparent that the question of how to measure the standard of efficiency of a farm, and to compare it with that of another, is a problem full of difficulty.

"The Farm as a Business," written primarily for advisory officers of the N.A.A.S., is an attempt to devise yardsticks and methods of comparison which, used with intelligence and a proper appreciation of local conditions, can provide valuable information regarding the standard of farm management and, if this is found to be wanting, to point the way to possible alterations in the system, or in the use of resources, to enable a higher continuous profit to be made.

Of particular interest to the practical farmer will be the system and yield indices, developed at the University of Reading as a quick and simple means of comparison between similar farms as regards output; the suggestion for measuring the economic efficiency of the farm business with special reference to the all-important use of labour and capital; and a clear, concise, account of how to estimate the financial effect of the reorganisation of a farm, or a section of it, by adopting the method of partial or complete budgeting according to the degree of complexity of the proposed changes.

As pointed out in the introduction to the handbook the volume and variety of resources available to the farmer have greatly increased in recent years. It is, therefore, doubly important that, in diagnosing a farm management problem, the evidence upon which the decision is to be based should be both extensive and reliable. The rather confident assertion that the financial accounts as prepared for income tax purposes, together with a few casual records, will suffice to evaluate a production programme may come as a surprise to many; and the assumption that, in determining the performance of a livestock enterprise, there is necessarily a crop exactly equivalent to any and every concentrate is not borne out in practice.

Nevertheless there is no doubt that many a farmer could reap much benefit from a clear understanding of the general principles outlined and from the methods of calculating efficiency provided always that both

he and his adviser were well aware of the inherent limitations.

The appendices consist of a wealth of statistical information, of great value for purposes of reference, in preparing a farm budget they would be of considerable assistance to those with records less than adequate.

The Chemistry of Lipids of Biochemical Significance. By J. A. LOVERN. (1955). Methuen & Co., Ltd., London. Price 8s. 6d.

Compared with the corresponding great groups of carbohydrates and proteins the fats have been relatively neglected, largely because of the greater difficulties attending their investigation. Nevertheless, knowledge of them is accumulating at an accelerating pace, and a book such as this, which presents in a very small compass (132 pages) a large amount of such knowledge (there are some 500 references, most of them recent) is very welcome. A fair amount of chemical background on the part of the reader is assumed by the author, and a liberal sprinkling of the first part of the text with graphic formulae is very helpful.

There are five chapters. The first is devoted to the subject proper—the structure of lipids—and deals with the triglycerides (five pages), the glycerophosphatides (15 pages), the sphingolipids (six pages), the sterols and sterol esters (two and a half pages) and, finally, the waxes (two and a half pages). The section describing the sterols and sterol esters is very short and can be regarded as little more than an introduction to the properties of these substances. The opening sentence of this chapter defines lipids as actual or potential derivatives of fatty acids or closely related substances and it is therefore perhaps a little surprising that the fatty acids receive no systematic treatment though, of course, this may well be part of the background knowledge which the author has assumed in his reader.

The third chapter—perhaps the most interesting in the book—takes the reader from the fats themselves to consider how they occur in tissues and gives a considerable amount of information about complex formation between lipids and proteins and carbohydrates.

The second chapter is devoted to the preparation and analysis of lipids. The first half of it is concerned with the extraction, purification and separation of fats and gives an idea of the difficulties encountered in this field. The second half of the chapter, dealing with the determination of specific materials incorporated into fats such as choline, ethanolamine, serine, sphingosin, inositol and carbohydrates is rather less valuable as it has to be so condensed ; again one notices the omission of the fatty acids from the scheme of analysis.

Half-way through the book there is a feeling of deviating slightly from the avowed subject—the chemistry of lipids. This is exaggerated in the last two chapters which examine the function of the lipids and their dynamic behaviour in the body. The author has taken advantage here of the latter half of the title of the book—lipids of biochemical significance—to dip amongst biological problems relating to fats and to examine what he selects with the outlook of a chemist. The selection he makes is physiological rather than biochemical and thus will not be everyone's choice. By consciously deciding not to discuss, probably from considerations of space, the intermediary metabolism of fatty acids, the author has parted us from many an exciting topic such as the synthesis of fatty acids from acetylcoenzyme A, the synthesis of fat by mitochondria, or the origin of milk fat.

The style is clear and the reviewer read the book with interest, enjoyment and considerable profit. The standard of Methuen's publications is well known and is here well maintained, though it must be admitted that the index could be expanded with advantage.

Proceedings of the British Society of Animal Production, 1954. Edited by I. L. MASON, and G. WIENER. Published by The Society, Edinburgh, 1954. Price 15s.

Sixteen papers on various aspects of animal production are contained in this volume. In the first paper Tayler discusses the difficulties in assessing the liveweight gains of grazing ruminants and shows that by weighing the animals at carefully selected times satisfactory estimates of carcase increases over a season can be obtained. Corbett reports on trials in progress at the Rowett Institute on the development of suitable pastures for the outwintering of cattle in the N.E. of Scotland. Studies on the nutrition of in-lamb ewes also carried out at the Rowett by Gill and Thomson showed that under cultivated grazing conditions supplementary feeding during the first winter of the ewe's life was not of subsequent benefit, but when the supplement was continued throughout successive pregnancies it resulted in heavier and better milking ewes and heavier lambs. Supplementary feeding during late pregnancy prevented the onset of pregnancy toxaemia.

Anatomical investigations on the vertebral column of the Welsh pig are described by Rees Evans with particular reference to the selection of pigs for breeding and improvement policies. Progeny testing of bulls is discussed by McArthur and also by Mason. McArthur's paper is of particular importance as it discusses a new technique for the evaluation of bulls, termed the "Relative Genetic Value" (R.G.V.), which is now being used by the Milk Marketing Board to cull their stud of progeny tested A.I. Bulls, and which will serve as a basis of the Board's breeding programme.

In a most interesting paper Adams discusses the possibility of speeding up improvement-of-livestock studies by the shortening of the generation interval. The method proposed is the induction of precocious sexual development in the female by gonadotrophic administration with the transfer of the ova so produced, after fertilisation, to a suitable foster mother. Applying this procedure in the rabbit, Adams was able to produce three rabbit generations annually. If this procedure could be adapted to the larger animals, schemes for grading-up and progeny testing could be carried out in a fraction of the normal time.

Other papers deal with seasonal changes in dairy herd management upon milk yield, mutton production, beef production and poultry selection.

News and Comment

PUBLICATION DURING THE STRIKE

The present railway strike will affect in some degree the publication of *The Record* but it is hoped to reduce the difficulties to a minimum. Late delivery of the journal would seem to be unavoidable if postal services are curtailed, though in the event of the strike being prolonged, consideration will be given to printing a day earlier. In-coming post is likely to be delayed also, and readers who wish to insert small advertisements, notices of meetings, etc., would be well advised to forward them in very good time.

THE HARRY STEELE-BODGER MEMORIAL PRIZE

Applications are invited by July 30th, 1955, from members of the Royal College of Veterinary Surgeons or Final Year students of any of the veterinary schools for the Harry Steele-Bodger Memorial Travelling Scholarship or grant towards a tour of study outside the United Kingdom or Eire in 1956.

Full details of the rules and regulations governing the award can be obtained from Mr. F. Knight, General Secretary, British Veterinary Association, 7, Mansfield Street, Portland Place, London, W.1.

The Steele-Bodger Memorial Fund was established in September, 1953, to honour the memory of Harry W. Steele-Bodger, President of the Association from 1939 to 1941 and Chairman of the Survey Committee from 1939 to 1946, in recognition of his great services to the veterinary profession and agriculture, more particularly during the war years of 1939 to 1945.

The Fund was sponsored by the B.V.A. and contributed to by organised bodies within the profession, including the student bodies of the University veterinary schools, by agricultural organisations and societies interested in farm stock, horses and dogs, by veterinary surgeons individually in this and other countries throughout the world, and by others among many friends and associates of the late Harry Steele-Bodger.

The object of the Memorial is to further what are felt to be his aims and aspirations and, to this end, a travelling scholarship or contribution to a tour of study abroad is awarded at least once in every four years.

The award will normally be the grant of income of the Fund for one year, or any part thereof, or failing suitable applicants or in special circumstances, may be the accumulated income of a period not exceeding four years (see footnote.)

The name and qualifications of the successful applicant will be announced in September, 1955, and he or she will be expected to take up the award by January 1st, 1956, and to have completed the work by December 31st, 1956.

The successful applicant is expected to provide a report in a form suitable for publication within six months of the completion of the tour of study, and the B.V.A. reserves the right to publish the report in *The Veterinary Record* if it so wishes.

(In the case of the first award, the one year's income was awarded, namely £125 1s. 4d.)

ELECTION TO R.C.V.S. COUNCIL 1955

At the Annual General Meeting of the Royal College of Veterinary Surgeons, held on Wednesday, June 1st, at 10, Red Lion Square, London, W.C.1, the Registrar read the certificate given by the Chartered Accountants of the Royal College of the election results which were:—

1st—Lamont, H. G.	1,425
2nd—White, J. B.	1,165
3rd—Wooldridge, W. R.	1,077
4th—Wilson, H. M.	1,010
5th—Bosworth, T. J.	918

the above were declared elected.

6th—Atkinson, G.	873
7th—Dall, J. A.	795

The total number of voting papers received was 1,731, of which 127 were returned by overseas members, and there were 18 voting papers declared invalid, for such reasons as their not being signed, or for more persons being voted for than was allowed. In one case, however, a voting paper for last year's election was used!

For comparison the number of voting papers received in previous years was:—

1955	1,731	(18 invalid)
1954	1,601	(31 invalid)
1953	1,396	(16 invalid)
1952	1,702	(32 invalid)
1951	No election	
1950	1,534	(32 invalid)
1949	1,466	(27 invalid)

At a Special Meeting of Council, held the same afternoon, the following officers were elected:—

President, Mr. H. Sumner.

Senior Vice-president, Dr. W. R. Wooldridge.

Junior Vice-president, Professor L. P. Pugh.

Treasurer, Mr. G. N. Gould.

PERSONAL

Births

EPPS.—On May 24th, to Louise (*née* Paling), wife of H. B. G. Epps, M.R.C.V.S., Braemore Road, Hove, a daughter, Nicola Ann.

FAULL.—On May 20th, 1955, to Pamela, wife of William Faull, B.SC., M.R.C.V.S., of The Vicarage, Moulsford, Berks, a daughter.

MINISTRY OF AGRICULTURE

Veterinary Field Staff

Mr. J. D. Gilmore, M.R.C.V.S., Veterinary Officer, has been transferred from Hereford to Stafford, and the following members have been appointed to the permanent staff as Veterinary Officers:—

Messrs. D. Hill, M.R.C.V.S., stationed at Truro, and D. B. Morgan, M.R.C.V.S., stationed at Llangefni.

HOLIDAY EXCHANGE

There appear to be a number of French veterinary surgeons whose sons and daughters would like to spend part of their summer holidays with British veterinary surgeons and, in return, would like to entertain the British children in their homes.

The following is a list of places where there is a French veterinary family who would like to make this exchange, and any member of the profession who is interested is asked to write as soon as possible to the General Secretary of the B.V.A. for further particulars.

Gers: 13-year-old boy.

Vienne: 16-year-old girl.

Maine-et-Loire: 14-year-old girl.

Vienne: 14-year-old boy.

Cholet (Maine-et-Loire): 14-year-old girl would like to stay in Southampton area from mid-July.

R.C.V.S. EXAMINATIONS

June 9th, Thursday.—D.V.S.M., Written Examinations commence at Edinburgh.

June 13th, Monday.—D.V.S.M. Oral and Practicals commence.

June 23rd, Thursday.—M.R.C.V.S. Written Examinations.

June 24th, Friday.—M.R.C.V.S. Written Examinations.

June 27th, Monday.—M.R.C.V.S., Practical and Orals commence (Panels "A" and "B").

B.V.A. COUNCIL AND COMMITTEE MEETINGS IN LONDON

Wednesday, July 6th.—

10.30 a.m. Home Appointments Committee, at 7, Mansfield Street, W.1.

12 noon Parliamentary and Public Relations Committee, at 7, Mansfield Street, W.1.

2.00 p.m. Organising Committee, at 7, Mansfield Street, W.1.

Thursday, July 7th.—

10.30 a.m. Veterinary State Medicine Committee, at 7, Mansfield Street, W.1.

2.30 p.m. General Purposes and Finance Committee, at 7, Mansfield Street, W.1.

Friday, July 8th.—

10.30 a.m. Council Meeting at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2.

COMING EVENTS

June

9th (Thurs.). Meeting of the Western Counties Division, B.V.A., at the Victoria Hotel, Newquay, 2.30 p.m.

Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, W.1, 10.30 a.m.

Annual General Meeting of the North of Scotland Division, B.V.A., in the Northern Hotel, Aberdeen, 2.30 p.m.

10th (Fri.). Annual Dinner of the R.A.V.C. Officers' Club, at Grosvenor House, Park Lane, London.

15th (Wed.). Meeting of the North Wales Division, B.V.A., at the Masonic Hall, Oswestry, 2.15 p.m.

16th (Thurs.). Annual General Meeting of the Herts and Beds Division, B.V.A., at 70, Holywell Hill, St. Albans, 7.30 p.m.

22nd (Wed.). Meeting of the Supplementary Veterinary Register Division, B.V.A., at 7, Mansfield Street, London, W.1, 2 p.m.

Annual General Meeting of the Southern Counties Division, B.V.A., at the Potters Heron Hotel, Ampfield, Nr. Winchester, 4 p.m.

23rd (Thurs.). Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, W.1, 10.30 a.m.

July

1st (Fri.). Ordinary General Meeting of the Society of Practising Veterinary Surgeons at the Dolwar Café, Carmarthen, 2.15 p.m.

28th (Thurs.) President's Invitation Luncheon and General Meeting of the Midland Counties Division, B.V.A., at the Swan Hotel, Stafford, 12.30 p.m.

September

4th to 10th. 73rd Annual General Meeting and Congress of the British Veterinary Association at Belfast.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Ayr. Carsloe Farm, Crosshill, Maybole (May 25).

Ches. Hollybush Farm, Crewe-by-Farndon, Chester (May 24).

Leics. Manor Farm, Nailstone (May 22).

Norfolk. Church House, Watlington, King's Lynn (May 22).

Northumberland. Swinhope Mill, Sparty Lea, Hexham (May 22).

Yorks. Station Garage, Meadow Bank, Hutton Ganswick; Street Farm, Fryup, Leaholm (May 25).

Fowl Pest

Essex. 77, Durham Road, East Ham, E.6 (May 25).

Lincs. Washdyke Lane, Commonside, Old Leake; Millhouse, Wrangle Bank, Boston (May 23).

Norfolk. Brookside, The Green, Shelfanger, Diss (May 24).

Swine Fever

Lancs. Radcliffe House Farm, Westhoughton, Bolton (May 18); Old Hall Farm, Sefton, Maghull, Liverpool, 23 (May 19); Stubbins Farm, Hothersall, Preston; 12, Colliery Lane, Atherton, Manchester (May 20); Spring Lea, Lancaster Old Road, Nateby, Preston (May 21); Ingol Nook Farm, Blackpool Road, Kirkham; Swill Brook Grange, Crown Lane, Bartle, Preston; Stanley House Farm, Staining, Poulton-le-Fylde (May 23).

London. Piggeries, Railway Arch, Manor Road, West Ham, London, E.15 (May 19).

Norfolk. 41, The Street, Kettlestone, Fakenham, Snape Lane, Downham Market (May 18).

Oxford. George Hotel, Dorchester-on-Thames (May 18); The Park, Lower Brailes, Banbury (May 20).

Salop. 6, Marton Grange, Baschurch, Shrewsbury (May 17); Home Farm, Acton Burnell, Shrewsbury (May 19); Grange Farm, Stirchley, Wellington (May 20); Leighton Home Farm, Leighton (May 21).

Staffs. Mill Farm, Gomshill Road, Longton, Stoke-on-Trent (May 20); Sunneyhayes Farm, Kingsley Holt, Stoke-on-Trent (May 23).

Stirling. 8, Lochmill Holding, Milton of Campsey, Glasgow (May 20).

Suffolk. Broadway Farm, Spexhall, Halesworth (May 18).

Surrey. Crewes Place Farm, Crewes Lane, Warlingham (May 17).

Sussex. Western House Farm, Albourne, Hassocks (May 18).

Warwicks. Hawkes Barn Cottages, Heathcote; Winterton Farm, Hockley Heath, Birmingham (May 17); Piggeries near Motor Research Association's premises, Watling Street, Higham-on-the-Hill, Nuneaton (May 18); Birmingham Road, Corporation Tip, Stratford-on-Avon (May 19); Holly Farm, Beausale (May 20).

Worcs. The Bungalow, Windmill Hill, Stoulton; Highfield Farm, Middle Lane, Headley Heath, Hollywood (May 18); Ridge Farm, Baccabox Lane, Hollywood, Birmingham (May 21).

Yorks. Barnborough Road Allotments, Goldthorpe, Rotherham (May 17); Forest Head Poultry Farm, Boggs Lane, Starbeck, Harrogate (May 19).

Derby. The Piggery, Old Engine Lane, Ashover, Chesterfield (May 24).

Lancs. Slate Lane Piggeries, Audenshaw, Manchester (May 24).

Leics. Lodge Farm, Ullesthorpe (May 25).

Salop. Edgegrove, Edge, Yockleton, Shrewsbury (May 25); Hill House Farm, Stoke Heath, Market Drayton; Top House Farm, Northwood, Wem (May 27).

Staffs. Woodshutts Farm, Kidsgrove, Stoke-on-Trent (May 25); Swan Farm, Forton, Newport; Forton Hall, Forton, Newport (May 27).

Stirling. No. 7, Lochmill, Milton of Campsie, Glasgow (May 25).

Surrey. Wyke Heath Farm, Normandy, Guildford (May 25).

Yorks. 48, Beaver Road, Beverley (May 26).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

REPETITION

Sir,—Like Mr. Crosfield I am a slave of the Test Chart and would welcome any relief from the stupefying boredom of spending my almost non-existent "free time" on transferring detailed information from one piece of paper to another.

I fear that his solution is too extreme to meet with approval and would moreover deprive the Ministry of much detail which might possibly be of use to them.

As an alternative might I suggest that Testing Notebooks be accepted by the Ministry. All the required information is inscribed therein as it is laboriously acquired on the farm and its transcription merely achieves the further removal of Head Office staff from the realities of life.

Yours faithfully,

P. K. HALL-PATCH.

Highlands,
Dibden Purlieu,
Southampton.

THE TOXICITY OF HEXACHLOROETHANE

Sir,—Hexachloroethane is used very extensively in this practice both in cattle and sheep, and is usually employed in conjunction with phenothiazine. The occasional toxic symptoms mentioned by Mr. Bywater appear to be successfully countered by the administration of dextrose—given either orally or subcutaneously. Casualties are, so far, negligible, and the results, if judged on purely empirical grounds, are consistently excellent.

I fail to see the merit in the period of fasting mentioned in Mr. Bywater's fourth paragraph.

Yours faithfully,

DENIS BRANAGAN.

Trumisgarry,
Lochmaddy,
Isle of North Uist.
May 22nd, 1955.